

Final Exam Review Page 1

$$1. \frac{373}{5} \cdot \frac{90+87+98+98+n}{5} = 92$$

$$\frac{5}{1} \cdot \frac{373+n}{5} = 92 \cdot 5 \quad \begin{array}{r} 373+n=460 \\ -373 \quad -373 \end{array}$$

$$n = 87 \text{ or better}$$

$$2. \frac{65 \cancel{\text{ sec}}}{1 \cancel{\text{ sec}}} \cdot \frac{1 \text{ mile}}{5280 \cancel{\text{ ft}}} \cdot \frac{60 \cancel{\text{ sec}}}{1 \cancel{\text{ min}}} \cdot \frac{60 \cancel{\text{ min}}}{1 \text{ hour}} =$$

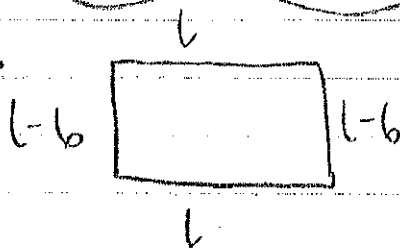
$$\frac{234,000}{5280} \approx 44.32 \text{ mph}$$

$$3. A = \frac{1}{2}bh (2)$$

$$\frac{2A}{b} = \frac{bh}{b}$$

$$h = \frac{2A}{b}$$

4.



$$l+l+l-6+l-6=60$$

$$4l-12=60$$

$$4l=72$$

$$l=18$$

$$w=18-6=12$$

$$w=12 \text{ ft.}$$

$$l=18 \text{ ft.}$$

$$\boxed{5)} f(x) = x^2 - 4x - 8 \quad g(x) = 2x^2 + x - 3 \quad h(x) = 4x^2$$

$$f(2) = (2)^2 - 4(2) - 8$$
$$= 4 - 8 - 8$$

$$= -4 - 8$$
$$\boxed{= -12}$$

$$g(-3) = 2(-3)^2 - 3 - 3$$

$$= 18 - 3 - 3$$

$$\boxed{= 12}$$

$$f(x) + g(x) = (x^2 - 4x - 8) + (2x^2 + x - 3)$$

$$= \boxed{3x^2 - 3x - 11}$$

$$f(x) - g(x) = (x^2 - 4x - 8) - (2x^2 + x - 3)$$

$$= x^2 - 4x - 8 - 2x^2 - x + 3$$

$$= -x^2 - 5x - 5$$

$$h(x) \cdot f(x) = 4x^2(x^2 - 4x - 8)$$

$$= \boxed{4x^4 - 16x^3 - 32x^2}$$

$$2f(x) + 3g(x) = 2(x^2 - 4x - 8) + 3(2x^2 + x - 3)$$

$$= 2x^2 - 8x - 16 + 6x^2 + 3x - 9$$

$$= \boxed{8x^2 - 5x - 25}$$

6. $y = 2x + 1$
 $-4x + 2y = 2$ } Use substitution!

$$\begin{aligned} -4x + 2(2x + 1) &= 2 \\ -4x + 4x + 2 &= 2 \\ 2 &= 2 \end{aligned}$$

D. Infinitely many answers

7. $\begin{cases} 2x + 5y = 19 \\ -3x + 4y = 29 \end{cases}$

$$\begin{array}{r} 6x + 15y = 57 \\ + \quad -6x + 8y = 58 \\ \hline 23y = 115 \end{array} \quad y = 5$$

$(-3, 5)$

$$2x + 5(5) = 19$$

$$2x + 25 = 19$$

$$2x = -6 \quad x = -3$$

8. $x = \text{true/false}$ $(x + y = 25) \cdot 2$
 $y = \text{MC}$ $2x + 4y = 70$

$$+ \quad -2x - 2y = -50$$

$$2y = 20 \quad y = 10$$

$$x = 15$$

15 T/F questions
 10 MC questions

9) $7x - y = 52$
 $2y = x - 26$
 $x = 2y + 26$

$(6, -10)$

$$7(2y + 26) - y = 52$$

$$14y + 182 - y = 52$$

$$13y + 182 = 52$$

$$13y = -130$$

$$y = -10$$

$$x = 2(-10) + 26$$

$$x = 6$$

Directions: For each problem, solve the quadratic by factoring (if possible), completing the square and by using the quadratic formula.

10)

Quadratic Equation	Solve by Factoring	Solve by Completing the Square	Solve by using the Quadratic Formula
$x^2 - 3 = 2x$ $x^2 - 2x - 3 = 0$	$(x-3)(x+1) = 0$ $x = 3 \quad x = -1$	$x^2 - 2x + 1 = 3 + 1$ $\sqrt{(x-1)^2} = \sqrt{4}$ $x-1 = \pm 2$ $x = 3 \quad x = -1$	$a=1 \quad b=-2 \quad c=-3$ $x = \frac{2 \pm \sqrt{(-2)^2 - 4(1)(-3)}}{2}$ $x = \frac{2 \pm \sqrt{4+12}}{2}$ $x = \frac{2 \pm 4}{2} = \boxed{3 \quad -1}$

11)

$2x^2 = -12x - 10$ $2x^2 + 12x + 10 = 0$	$2(x^2 + 6x + 5) = 0$ $2(x+5)(x+1) = 0$ $x+5 = 0 \quad x+1 = 0$ $x = -5 \quad x = -1$	$x^2 + 6x + 9 = -5 + 9$ $\sqrt{(x+3)^2} = \sqrt{4}$ $x+3 = \pm 2$ $x = -3 \pm 2$ $x = -5 \quad x = -1$	$a=1 \quad b=6 \quad c=5$ $x = \frac{-6 \pm \sqrt{6^2 - 4(1)(5)}}{2}$ $x = \frac{-6 \pm \sqrt{16}}{2}$ $x = \frac{-6 \pm 4}{2} \quad \boxed{x = -5 \quad x = -1}$
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12

$x^2 - 2x - 48 = 0$	$(x-8)(x+6) = 0$ $x-8 = 0 \quad x+6 = 0$ $x = 8 \quad x = -6$	$x^2 - 2x + 1 = 48 + 1$ $\sqrt{(x-1)^2} = \sqrt{49}$ $x-1 = \pm 7$ $x = 1 \pm 7 \quad \boxed{x = 8 \quad x = -6}$	$a=1 \quad b=-2 \quad c=-48$ $x = \frac{2 \pm \sqrt{(-2)^2 - 4(1)(-48)}}{2}$ $x = \frac{2 \pm \sqrt{4+192}}{2}$ $x = \frac{2 \pm 14}{2} \quad \boxed{x = 8 \quad x = -6}$
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13

$2x^2 + 4x = x^2 + 2x + 63$ $x^2 + 2x - 63 = 0$	$(x+9)(x-7) = 0$ $x+9 = 0 \quad x-7 = 0$ $x = -9 \quad x = 7$	$x^2 + 2x + 1 = 63 + 1$ $\sqrt{(x+1)^2} = \sqrt{64}$ $x+1 = \pm 8$ $x = -1 \pm 8 \quad \boxed{x = -9 \quad x = 7}$	$a=1 \quad b=2 \quad c=-63$ $x = \frac{-2 \pm \sqrt{4 - 4(1)(-63)}}{2}$ $x = \frac{-2 \pm \sqrt{256}}{2}$ $x = \frac{-2 \pm 16}{2} \quad \boxed{x = 7 \quad x = -9}$
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14)

$3x^2 + 36 = 4 + 20x$ $3x^2 + 20x + 32 = 0$	$3x^2 + 20x + 32 = 0$ $3x^2 - 20x + 32 = 0$ $x^2 - 20x + 96 = 0$ $(x-4)(x-8) = 0$ $(x-4)(3x-8) = 0$	$\frac{3x^2}{3} - \frac{20x}{3} + \frac{32}{3} = 0$ $x^2 - \frac{20}{3}x + \frac{32}{3} = 0$ $x^2 - \frac{20}{3}x + \frac{400}{9} = \frac{32}{3} + \frac{400}{9}$ $\sqrt{(x - \frac{20}{6})^2} = \sqrt{\frac{16}{36}}$ $x - \frac{20}{6} = \pm \frac{4}{6}$ $x = \frac{20}{6} \pm \frac{4}{6}$	$a=3 \quad b=-20 \quad c=32$ $x = \frac{20 \pm \sqrt{400 - 4(3)(32)}}{6}$ $x = \frac{20 \pm \sqrt{16}}{6}$ $x = \frac{20 \pm 4}{6} = \boxed{4, \frac{8}{3}}$
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$x = 4$
 $x = \frac{8}{3}$

$\frac{20}{3} \div \frac{1}{2} = \frac{40}{3}$
 $\frac{40}{3} - \frac{32}{3} = \frac{8}{3}$
 $\sqrt{\frac{64}{9}} = \frac{8}{3}$

$x = \frac{20}{6} \pm \frac{4}{6}$
 $x = \frac{20}{6} \pm \frac{4}{6}$
 $\boxed{x = 4 \quad x = \frac{8}{3}}$

$$15) \quad 2(x-1)^2 - 1 = 7$$

+1 +1

$$\frac{2(x-1)^2}{2} = \frac{8}{2}$$

$$\sqrt{(x-1)^2} = \sqrt{4}$$

$$x-1 = \pm 2$$

$$x = 1 \pm 2$$

$$x = 3, x = -1$$

$$-4x^2 = -16$$

$$\sqrt{x^2} = \sqrt{4}$$

$$x = \pm 2$$

Topics from Unit 3B: Graphing and Converting Quadratics

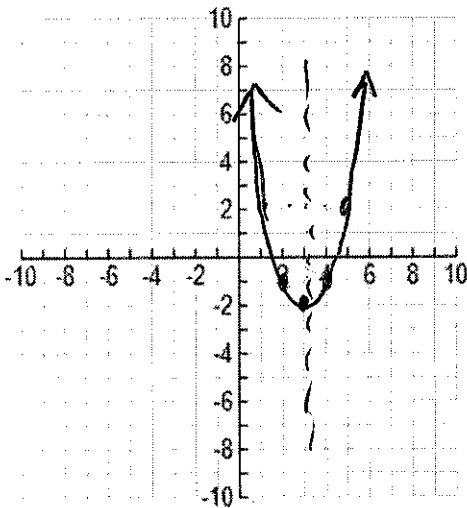
16. $f(x) = (x-3)^2 - 2$

x/y table:

a) Vertex: $(3, -2)$ AOS: $x=3$

c) y-intercept: $(0, 7)$

d)



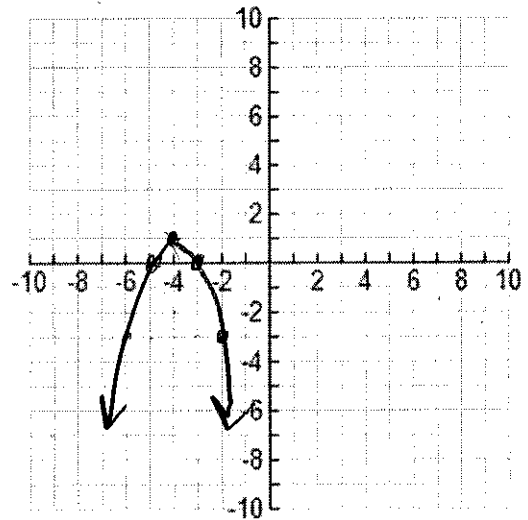
17. $f(x) = -(x+4)^2 + 1$

x/y table:

a) Vertex: $(-4, 1)$ AOS: $x=-4$

c) y-intercept: $(0, -15)$

d)

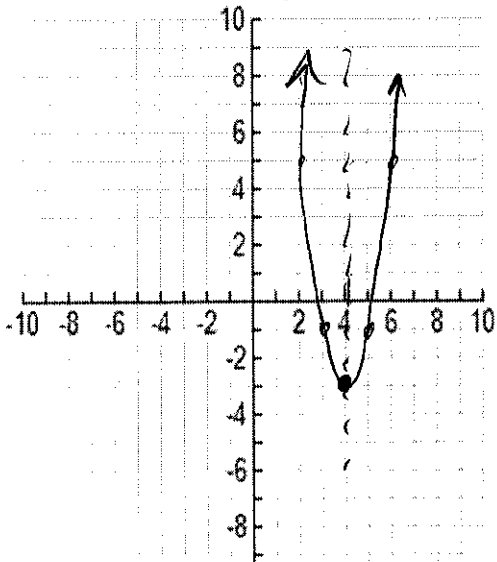


18) $f(x) = 2x^2 - 16x + 29$
 $x = \frac{16}{2(2)} = 4$

x/y table:

a) Vertex: $(4, -3)$ AOS: $x=4$

c) y-intercept: $(0, 29)$

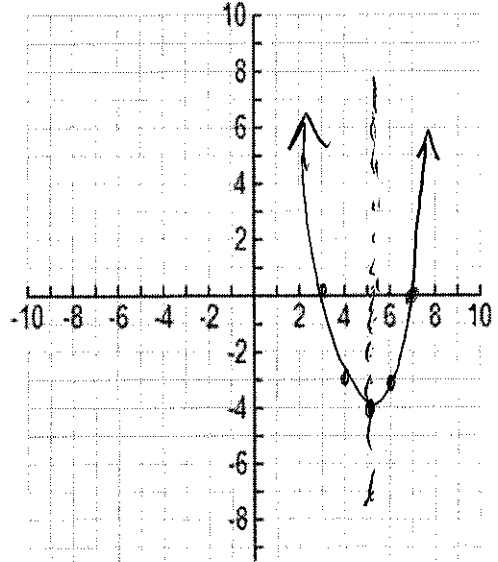


19) $f(x) = x^2 - 10x + 21$
 $x = \frac{-b}{2a} = \frac{10}{2}$

x/y table:

a) Vertex: $(5, -4)$ AOS: $x=5$

c) y-intercept: $(0, 21)$



Convert each of the following:

20. Write in intercept form: $y = x^2 - 3x + 2$ factor

$$y = (x-2)(x-1)$$

21. Write in standard form: $y = -2(3x-2)^2 - 5$

$$y = -2(3x-2)(3x-2) - 5$$

$$y = -2(9x^2 - 6x - 6x + 4) - 5$$

$$y = -18x^2 + 24x - 8 - 5$$

$$y = -18x^2 + 24x - 13$$

22. Write in vertex form: $y = -2x^2 + 6x - 3$

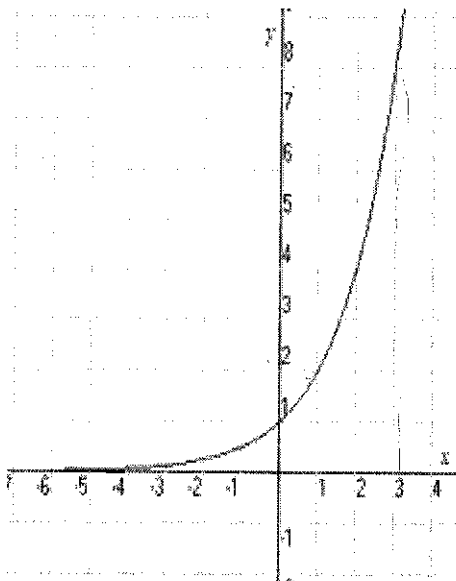
$$x = \frac{-b}{2a} = \frac{-6}{-4} = \frac{3}{2}$$

$$y = 1.5$$

$$y = -2(x - \frac{3}{2})^2 + \frac{3}{2}$$

Topics from Unit 4:

19. Find the characteristics of the following graph.



Domain: \mathbb{R}

Range: $y > 0$
 $(0, \infty)$

X-intercept: none

Y-intercept: $(0, 1)$

Increasing or Decreasing: increase $(-\infty, \infty)$

End Behavior: As $x \rightarrow \infty$, $y \rightarrow \infty$

As $x \rightarrow -\infty$, $y \rightarrow 0$

Rate of change from $x = 1$ to 3 . $m = 3$

$(1, 2)$ $(3, 8)$

$$m = \frac{8-2}{3-1} = \frac{6}{2} = 3$$